Article

Intra-articular rice bodies: Imaging for persistent joint pain

Dr FE Suleman MBChB(Natal), FCRad(D)(SA), MMedRad(D)(Medunsa)
Department of Radiology, University of Pretoria
Dr MD Velleman MBChB(UP), FCRad(D)(SA), MMedRad(D)(UP)
Little Company of Mary Medical Centre, Pretoria

Reprint requests:
Dr FE Suleman
PO Box 13044
Laudium
0037
Tel: 0027833020295
Fax: 002786639874
Email: fesuleman@gmail.com

Abstract
Rice bodies are fibrous bodies that macroscopically resemble grains of rice. They may uncommonly occur as a complication of inflammatory arthritides but may create diagnostic confusion when the patient has no underlying inflammatory disease. The combined use of ultrasound, magnetic resonance imaging (MRI) and plain film makes it possible to reach a correct diagnosis. We describe a patient with a chronic monoarthritis of unknown aetiology who presented with rice bodies in the right elbow joint demonstrated on MRI.

Key words: rice bodies, synovitis, arthritis, elbow, MRI, ultrasound

Introduction
Chronically inflamed joints with proliferation and hypertrophy of the synovium may occasionally be complicated by rice bodies. Rice bodies were originally described in association with tuberculous arthritis but are now most frequently seen in patients with rheumatoid arthritis[1] although any inflammatory arthropathy may predispose a patient to this complication. We describe a patient with a chronic monoarthritis of unknown aetiology who presented with rice bodies in the right elbow joint.

Case report
A 43-year-old female patient was referred to the Radiology Department with right elbow pain. She had no evidence of underlying rheumatoid arthritis. Plain radiographs of the elbow were within normal limits (*Figure 1*). Ultrasound demonstrated a posterior joint effusion with echogenic material (*Figure 2*). The rest of the structures around the joint were within normal limits. The patient was treated conservatively but three months later failed to show any response to treatment.

Figure 1. Lateral radiograph of the right elbow joint is within normal limits

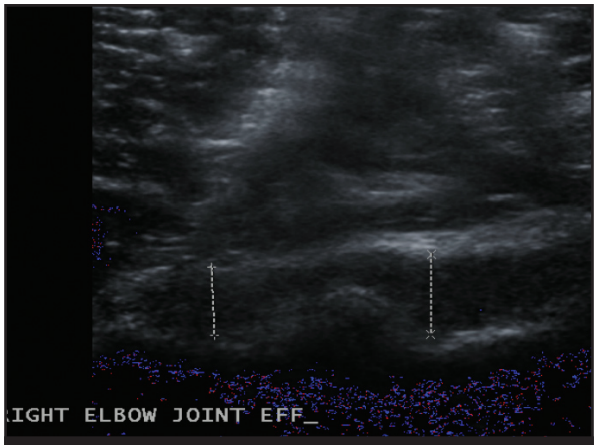

Figure 2. Transverse ultrasound of the posterior right elbow joint shows a complex effusion

The patient was then referred for MRI which demonstrated a joint effusion with synovial hypertrophy, proliferation and multiple loose nodular bodies that were hypointense on fat-suppressed proton density weighted imaging (*Figures 3a and b*). No specific blooming-type artefact was noted on the gradient echo study (*Figure 4*). Other than mild changes suggesting a lateral epicondylitis, no other abnormalities were seen.

The diagnosis of synovitis with rice body formation was confirmed at arthroscopy. Fluid from the joint space was sent for microscopy and culture and the results were negative for all organisms including acid-fast bacilli. All inflammatory markers were negative.

The patient's symptoms settled post-operatively and she made an uneventful recovery. Six months later no recurrence was noted.

In cases where no underlying disease process such as systemic arthropathy is present, surgery can result in complete resolution of symptoms

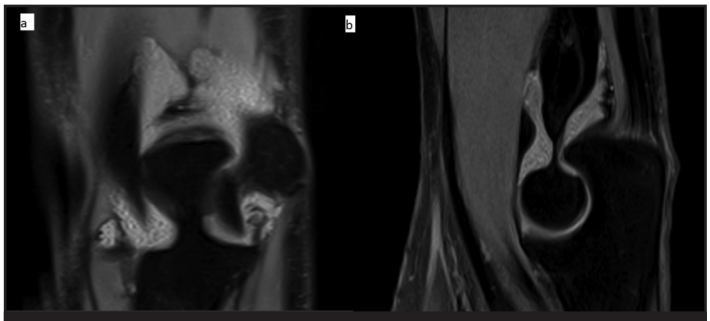

Figure 3a and b. Fat-suppressed proton density coronal and sagittal views of the right elbow demonstrate a joint effusion with multiple hypointense loose bodies within it

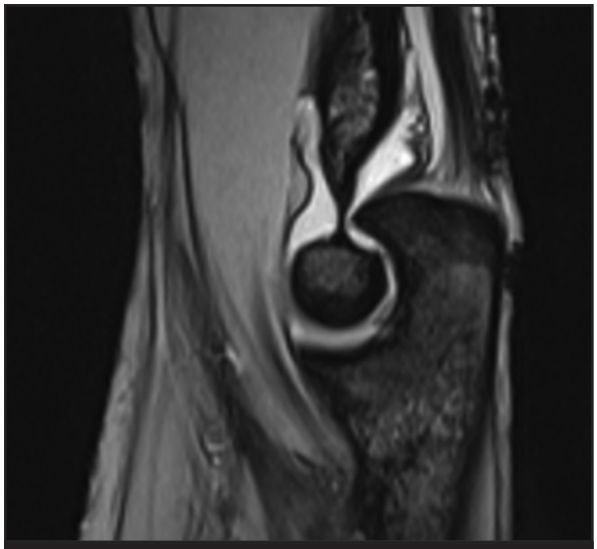

Figure 4. Gradient echo sagittal image of the right elbow does not demonstrate any 'blooming' artefact

Discussion

Several theories exist as to the aetiology of rice body formation but the definite cause remains unclear.[2] It is associated with synovial proliferation and hypertrophy in the joint space and it has been suggested that synovial cells undergo infarction and are shed into the joint where they become encased by fibronectin over time.[2] Another theory simply suggests that fibrin accumulates in the villous structures of the hypertrophied synovium causing them to elongate and snap off.[3]

Rice bodies are an uncommon phenomenon that occurs most commonly in patients with rheumatoid arthritis but are also known to occur in patients with tuberculous arthritis or rarely in the absence of underlying systemic disorders.[1] The clinical relevance lies in the fact that fibrin is a known irritant and therefore rice bodies have been implicated as a stimulus for continuing synovial inflammation.[3] Their removal therefore produces clinical improvement and in cases where no underlying disease process such as systemic arthropathy is present, surgery can result in complete resolution of symptoms.[2] Imaging helps in diagnosis as well as in surgical planning.

The important differential diagnoses that need to be excluded in patients with rice bodies are synovial chondromatosis and pigmented villonodular synovitis.[1-5]

Plain radiographs of the affected joints may be normal for both rice bodies and early phases of synovial chondromatosis. Late phases of synovial chondromatosis will demonstrate calcified bodies within the joint space. Ultrasound for all three possibilities in the differential diagnosis will demonstrate an effusion with loose bodies or a complex mass. In calcified synovial chondromatosis, posterior acoustic shadowing may be noted.[1,5]

MRI produces the most characteristic findings of all imaging modalities. Rice bodies appear as hypointense loose bodies on all sequences on MRI with the low signal on T2-weighted and proton density-weighted imaging, making it possible to restrict the diagnosis.[1,2,5] Uncalcified bodies of synovial chondromatosis have a high signal on T2-weighted images (making them difficult to visualise) and while this may change to low signal when the loose bodies calcify, the calcified bodies are then visible on plain film, allowing the diagnosis to be made.[1,5] The lack of susceptibility artefact in rice bodies on gradient echo sequences helps to distinguish them from pigmented villonodular synovitis.[5]

Conclusion

The diagnosis of rice bodies may be delayed or missed, especially in patients who lack a relevant history or clinical findings typical of underlying systemic arthropathies. It should be an important consideration in patients whose joint symptoms persist despite treatment, as their presence provides an irritant within the joint that prevents resolution on medical therapy alone. Imaging plays a vital role in making a definitive diagnosis and advanced imaging such as MRI must be considered in the presence of normal radiographs.

No benefits of any form have been received from a commercial party related directly or indirectly to the subject of this article. The content of this article is the sole work of the authors.

References

1. Rapitz JM, Martin SM, Vilamajo IR, Pons JT, Androver PA. Subacromial bursitis with rice bodies. *Journal of Orthopaedics* 2007;4(4).
2. Matsumoto K, Fujita K, Fujioka H, Matsushima S, Kouso K, Yamaguchi S, Kurosaka M, Yoshiya S. Massive nonspecific olecranon bursitis with multiple rice bodies. *J Shoulder Elbow Surg* 2004;13:680-83.
3. Reid HS, McNally E, Carr A. Soft tissue mass around the shoulder. *Ann Rheum Dis* 1998;57:6-8.
4. Chen A, Wong L, Sheu C, Chen B. Distinguishing multiple rice body formation in chronic subacromial subdeltoid bursitis from synovial chondromatosis. *Skeletal Radiol* 2002;31:119-21.
5. Spence LD, Adams J, Gibbons D, Mason MD, Eustace S. Rice body formation in bicipito-radial bursitis: ultrasound, CT and MRI findings. *Skeletal Radiol* 1998;27:30-32.